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Beef Quality Assurance—Past, Present, Future

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The Beef Quality Assurance Task Force (BQATF) was formed in early 1986 when three NCBA (then, the National Cattlemen's Association) Policy Committees independently directed NCBA to address "the growing issue of consumer concern about the safety and wholesomeness of beef." It was believed that the cattle industry's efforts aimed at improving beefs image as a healthful food with regard to its nutrient profile could not stand alone, and that lingering consumer concerns about drug and chemical residues in beef could negate any progress made in the diet/health area. Consequently, the BQATF (then, the Beef Safety Assurance Task Force) was formed with the objective of "Enhancing The Image Of Beef As A Safe And Wholesome Food."

The BQATF initially interacted with officials/representatives of Food and Drug Administration, U.S. Department of Agriculture, Food Marketing Institute, American Meat Institute, American Health Institute and a consumer activist group. The composition of the first NCBA, BQATF was Darrell Wilkes (staff), Dee Griffin (Technical Advisor) and--as members-- Wes Bonner, Mike Bowles, Bob Dubbert, Tom Olsen, Don Williams, Jack Algeo, Bill Brown. Warren Weibert, Bob Bohlender and Dick Mercer, The members of the BQATF, in 1986, developed a Summary Statement which began:

"The cattle industry must recognize that a significant degree of consumer concern exists with regard to the presence of drug and chemical residues in beef. While residue data from USDA and FDA do not support this degree of consumer concern, it exists nevertheless."

Excerpts from the BQATF Summary Statement include:

- "Current industry efforts to overcome consumer misperceptions are defensive (reactive rather than proactive), and will never succeed in alleviating consumer concerns about beef safety."
- "The apparent solution to this problem lies with individual cattlemen who are willing to embark upon some kind of beef safety assurance program; a program which gives added assurance that all animal drugs and production chemicals are used properly and that no unacceptable residues are created."
- "Something substantive must be done by individuals; general public relations and promotional campaigns cannot replace genuine efforts to provide greater assurance of beef safety and wholesomeness."
- "An industry-initiated program, adopted voluntarily and individually by industry

members, will be more effective in enhancing consumer confidence in beef as a safe and wholesome food than the alternative of stricter government regulations on the use of animal drugs."

- "The Task Force feels certain that the marketplace will increasingly demand beef produced under a safety assurance program; hence, even in the absence of consumer research, cattlemen are advised to begin developing a safety assurance program.

The BQATF Summary Statement concludes as follows:

"It is within the grasp of individual cattlemen to alleviate consumer concern about the safety and wholesomeness of beef, or at least to protect themselves from the negative publicity created by their less-careful colleagues. Industry organizations such as NCBA and its affiliates cannot wave the magic wand of public relations and promotion, and alleviate consumer concerns about beef safety. It will require action By individuals within the industry."

Developed through discussion, reading, studying and consultation were the following BQATF consensus points:

- (1) Consumer concern about drug and chemical residues in beef is a threat to the cattle industry and must be addressed.
- (2) The Task Force, and some contacts, agree that part of the criticism received concerning the industry's use of drugs and chemicals is spill-over from the diet/health issue.
- (3) The cattle industry, or its individual members, must do something substantive in order to alleviate consumer concern about the safety and wholesomeness of beef, from the standpoint of drug and chemical residues. We cannot rely on public relations efforts exclusively to address this issue.
- (4) A Safety Assurance Program is needed in order to accomplish the objective of "Enhancing The Image Of Beef As A Safe And Wholesome Product." Additional government regulations are not a viable alternative.
- (5) A Safety Assurance Program of some kind will become a de-facto requirement for doing business in the future for an unidentified, but increasing, portion of the market.
- (6) A majority of cattlemen are ready to accept the responsibility of a Safety Assurance Program.
- (7) Veterinarians and producers will become partners in safety assurance.
- (8) Issues with the potential of damaging the image of beef from a safety wholesomeness

standpoint should be identified so that a strategy to protect the industry from adverse publicity can be developed before the issue becomes a consumer concern or crisis.

- (9) As an industry, we do not know what the consumer expectations are with regard to added assurance of beef's safety and wholesomeness. Consumer research is needed.
- (10) Producers using drugs and chemicals, or allowing others to do the same, in their cattle will assume greater liability than in previous years.
- (11) Clinical residue studies should be done not only with regard to off-label drug use, but also in the tissue clearance of drugs from clinically ill cattle.
- (12) The industry and its organization should take a more active role in reprimanding those persons who recommend or practice illegal use of drugs or chemicals.

The NCBA Beef Quality Assurance Program was – initially - patterned after the BQA Program of the Texas Cattle Feeders Association(TCFA). The TCFA, BQA Program had as its objective--"To ensure that all cattle shipped from this feedyard are healthy, wholesome and meet FDA, USDA and EPA specifications. This program is a cooperative effort between the feedyard and government agencies and is monitored by periodic sampling of carcasses at packing plants by FSIS." The "Certificate" used by TCFA for its BQA Program delineates six Procedures:

- (1) Feed Sources--a quality control program plus analysis of ingredients suspected of contamination.
- (2) Feed Medications--use only FDA approved additives and comply with additive withdrawal times.
- (3) Individual Treatments--medication schedule must be by a veterinarian and records kept; all animals for slaughter must meet withdrawal times; animals given off-label drugs will be randomly tested; FSIS will randomly sample at the slaughter plant with STOP, and other in-plant, tests.
- (4) Pesticides--only EPA-approved pesticides used, in compliance with label directions.
- (5) Maintenance Of Records--rations, feed additives and individual treatments recorded; if FSIS finds residues, applicable records are available to FSIS officials.
- (6) Action In Case Of Potential Or Actual Violation--unacceptable residues found by FSIS reported by telephone to feedlot; joint assessment by feedlot and FSIS personnel to find source, cause and appropriate corrective action.

From 1986 through 1996, Colorado, then Nebraska, and most of the other states followed the lead of Texas and developed Beef Quality Assurance Programs that then affiliated with the NCBA, BQA Program. Today, 98 percent of cattle going through feedlots and 90 percent of

cattle on farms and ranches are from states with BQA Programs. The NCBA, BQA Program has, over its decade of existence, accomplished many milestone achievements. Included as successful studies, programs, investigations and/or achievements are the following:

- (1) National Beef Quality Audit (1991)--Quality losses for every fed cattle slaughtered in 1991 totaled \$279.82. Of the \$279.82, cattlemen could recover \$219.25 by attacking waste, \$28.81 by enhancing taste, \$27.26 by improving management, and \$4.50 by controlling weight.
- (2) Antibiotic Violative Residues; USDA/FSIS National Residue Program (1983-1993)--Violative residues in samples obtained in 1983 occurred in 0.0%, 0.0%, 0.0% and 3.6% of tissues from bulls, cows, slaughter steers/heifers and calves; violative residues in samples obtained in 1993 (the latest year for which data have been reported) occurred in 0.0%, 0.5%, 0.0% and 0.9% of tissues from bulls, cows, slaughter steers/heifers and calves. Diligence of cattlemen--at least in part, due to BQA Programs--have maintained (or lowered, in the cases of calves) exceptionally low incidences of antibiotic residues in beef and veal tissues
- (3) National Non-Fed Beef Quality Audit (1994)--Quality losses for every non-fed cattle slaughtered in 1994 totaled \$69.90, cattlemen could recover \$14.60 by managing, to minimize defects and quality deficiencies; \$27.65 by monitoring health and condition; and \$27.65 by marketing in a timely manner.
- (4) Incidence Of Pesticide Residues And Residues Of Chemicals Specified For Testing In U.S. Beef By The European Community 1994--Muscle, adipose tissue, kidney and liver tissues were tested for residues of four anabolic steroids, two environmental contaminants, a beta-blocker, a beta-agonist, two tranquilizers and six sulfa-drug thyrostatics; and, adipose tissue samples were tested for residues of 25 individual chlorinated-hydrocarbon and organophosphate pesticides. In the 1,780 chemical tests performed, no residue amount that would be considered violative was detected.
- (5) Incidence Of Injection-Site Blemishes In Beef Top Sirloin Butts (1994)--Six individual and sequential national audits of injection-site blemishes in top sirloin butts were conducted (July 1991 through March 1993). Incidence of blemishes was 21.27%, 14.03%, 15.41%, 12.11%, 10.01% and 10.87% in the national audits of July 1991, November 1991, March 1992, July 1992, November 1992 and March 1993, respectively. If the activities of the NCBA, BQA Task Force reduced incidence of injection-site blemishes from 21.27% to 10.87%, the savings to the U.S. beef industry amounted to \$26,876,512.
- (6) National Beef Quality Audit (1995)--Quality losses for every fed cattle slaughtered in 1995 totaled \$137.82. Of the \$137.82, cattlemen could recover \$47.76 by increasing red meat yield, \$38.30 by enhancing taste/tenderness, \$47.10 by improving management, and \$4.66 by controlling weight.

- (7) Injection-Site Lesions: Incidence, Tissue Histology, Collagen Concentration, And Muscle Tenderness In Beef Rounds (1995)--National incidence of injection-site lesions in the muscles of the round were determined by a national audit; injection-site lesion incidence in beef round cuts audited at retail was 8.45% and in steak-cutting facilities was 10.04% (overall incidence was 9.74%). Warner-Bratzler shear measurements taken near lesions and in areas 3 inches from the lesions were higher for lesioned, than for control, bottom-round steaks; Warner-Bratzler shear values for lesion cores were 3.5 times greater than those in paired control (non-affected) steaks.
- (8) Injection-Site Lesions In Carcasses of Cattle Receiving Injections At Branding And At Weaning (1995)--Injections at branding of 2mL of clostridial, 5mL of clostridial, vitamin AD₃ and OTC caused injection-site lesions in 72.5%, 92.7%, 5.3% and 51.2%, respectively, of inside rounds from slaughter cattle. Before completion of this study, it was thought that injection-site lesions were from damage that subsisted only briefly following an inoculation; these results made it abundantly clear that intramuscular administration of clostridials and certain antibiotics will cause damage so severe that it will be evident in beef muscle 7.5 to 12 months later.
- (9) Incidence And Sensory Evaluation Of Injection-Site Lesions In Beef Top Sirloin Butts (1996)--The national incidence of injection-site lesions in top sirloin butts did not change between July 1993 (10.91%) and July 1995 (10.19%). Warner-Bratzler shear measurements of lesion-afflicted steaks taken near the site of lesions and in areas up to 3 inches from the lesion center were significantly greater than were comparable measurements on control top sirloin steaks. Injection-site lesions were still occurring at an unacceptable frequency in the top sirloin butt, and those lesions, if not removed entirely, can dramatically reduce the desirability of top sirloin steaks.
- (10) Residues Of Antibiotics, Hormones And Pesticides In Conventional, Natural And Organic Beef (1997)--Analyses of "Conventional," "Natural" and "Organic" beef samples revealed no violative residues of three anabolic steroids, three xenobiotics, a 8-lactam antibiotic, two macrolide antibiotics, four sulfa-drugs, three tetracycline antibiotics and 25 individual chlorinated-hydrocarbon and organophosphate pesticides. The only violative residues of any chemical found in these studies were in liver and not in meat. Results of this study demonstrated that it is highly unlikely that there is any difference in presence of harmful chemical residues of drugs, vaccines, pesticides, antibiotics and/or growth promotants in "Conventional," "Natural" and "Organic" beef.
- (11) Injection-Site Lesions In Beef Subprimals: Incidence, Palatability Consequences, And Economic Impact (1997)--Although the perceived progress is real, injection-site lesions remain a serious quality-control concern and continue to cause huge economic loss in the U.S. beef industry. Trim losses and decreased tenderness resulting from injection-site lesions in top sirloin butts, bottom rounds, eye of rounds, and inside rounds represented an estimated monetary loss of \$200,338,253 (\$7.05 per steer or heifer slaughtered) in 1995 to the U.S. beef industry. However, the full cost of these lesions must also include customer dissatisfaction. The extreme variations in palatability resulting from inadequate

trimming of injection-site lesions in beef subprimals is estimated to affect 70.8 million meals annually.

- (12) Pesticide Residues In Beef Tissues From Cattle Fed Fruits, Vegetables And Their Byproducts (1997)--Muscle, adipose, liver and kidney tissues were collected from cattle fed potato processing residue, apple pomace, pear pomace, cannery corn waste, cotton gin trash, tomato pomace plus almond hulls, dried grape solids or dried citrus pulp as well as from control cattle. In 2,720 tests (of beef tissues and feedstuffs) of ten oncogenic pesticides, eight tests were positive but no residue amount that would be considered violative was detected. The only pesticide detected was benomyl and it was detected at nonviolative levels in the adipose tissue of cattle that had been fed either apple pomace or pear pomace.
- (13) Incidence, Severity, Amount Of Tissue Affected And Effect On Histology, Chemistry And Tenderness Of Tissue In And Around Injection-Site Lesions In Beef Cuts From Calves Administered A Control Compound Or One Of Seven Chemical Compounds (1997)--Incidence, severity, histological ramifications and tenderness effects of injection-site lesions produced by the intramuscular administration of a control compound (sterile saline) or of one of seven biological and pharmaceutical compounds. Most compounds administered caused, 178 days later, an unacceptably high lesion incidence in both top sirloin butts and outside rounds. The volume of toughened tissue, as compared to control, contralateral subprimals was 618 to 1,042 cubic centimeters in outside rounds and 308 to 811 cubic centimeters in top sirloin butts. The intramuscular administration of all of the compounds (including sterile saline) caused unacceptable tissue consequences. Intramuscular injections must be eliminated!
- (14) Factors Contributing To The Incidence Of Dark Cutting Beef And Management Strategies To Reduce The Occurrence Of Dark Cutters (1997)--Feedlot data were obtained from 2,672,223 cattle from nine commercial feedyards. Feedyard, gender, implant treatment, days from final implant to slaughter, maximum and minimum daily temperatures, and temperature fluctuations from 48 hours before harvest to the day of harvest, all contributed to the incidence of dark cutters. Data from these 15,439 pens of cattle suggest that the use of estrogenic re-implants before slaughter in heifers, and combination (androgen and estrogen) implants, either as steers enter the feedlot or as re-implants before slaughter, increase the risk of incurring dark cutters. Additionally, the time from re-implant to slaughter should extend past 100 days to minimize carcass non-conformance due to dark cutting beef. Feedlot management practices should also incorporate seasonal climatic trends (hot weather and large temperature changes) at the time of slaughter when determining implant administration. By optimally combining these factors, producers can continue to optimize growth performance with the use of moderate growth promoting implants, while at the same time reducing economic losses and carcass non-conformance due to the occurrence of dark cutters.
- (15) Multiple Hurdles For Beef Carcass Decontamination (1997)--(a) Decontamination of beef carcasses can be achieved by knife-trimming followed by spray-washing or by spray-washing followed by hot-water rinsing. (b) Combinations consisting of three or four

decontamination treatments were more effective in reducing microbial loads on beef carcasses than were treatment combinations of one or two microbiological interventions.

©) Chemical dehairing of beef carcasses using a combination of sodium sulfide, hydrogen peroxide, hot water plus acetic-acid solution successfully reduced numbers of bacterial pathogens on hide samples inoculated with feces.

- (16) Current Results Of National Audits Of Injection-Site Lesions In Cuts From Non-Fed And Fed Slaughter Cattle (1997)-Results of the latest national audits revealed (a) an incidence of 5.61% (down from 21.27% in July 1991) in top sirloin butts from fed cattle in July 1997, (b) an occurrence of 4.44% (down from 9.74% in August 1994) in bottom rounds from fed cattle in August 1997, and ©) an incidence of 37.45% (up from 23.01% in April and October, 1995) in gooseneck rounds from non-fed cattle in April, 1997. Excellent progress has been made in reducing incidence of injection-site lesions in muscles from fed cattle but incidence of injection-site lesions in muscles from non-fed cattle remains unacceptably high.

A July 1995, Project Evaluation Audit by the Cattlemen's Beef Promotion And Research Board described the "Achievements of the Beef Quality Assurance Program" as follows:

- From the national level down to the county level, the BQA Program is the most direct communications link the cattle industry has for the transmission of educational information about the safety and quality of our product. Progress made on the injection-site lesion issue is the best example of how this communication system benefits the industry.
- The BQA Task Force (BQATF), state coordinators, and NCBA staff have assembled a credible, producer-initiated program. The BQA Program has earned the respect of many groups outside the industry including members of the U.S. government and the media.
- The national program has been flexible enough to allow states to custom tailor the BQA Program to their particular needs. At both the national and local levels, the program is relatively free of bureaucracy and red tape, which allows it to respond quickly.
- The program has evolved from one focused on producer concerns to one that is now concentrated on product concerns.
- The makeup of the BQATF has been a good balance of expertise and knowledge from different industry segments, which coupled with its dedication, has resulted in the growth and success of the program.
- The tenacity and commitment of national staff has also been a factor in the development and success of BQA.

- State coordinator's annual meetings have been very useful for exchanging information and ideas.

Dr. Stephen F. Sundlof, Director of the Center for Veterinary Medicine (Food and Drug Administration) said, in 1997, "The Center for Veterinary Medicine recognizes that the Beef Quality Assurance Program is endorsed by cattle industry leaders in all parts of the country. It provides cattle producers with information on proper animal health product use, keeping adequate records, and helps assure consumers a supply of high quality and wholesome beef products. The Center for Veterinary Medicine supports and applauds the success of the Beef Quality Assurance Program." Dr. Bonnie Buntain, Director of the Animal Production Food Safety Program of the Food Safety and Inspection Service (U.S. Department of Agriculture) said, in 1997, "The Food Safety and Inspection Service supports the implementation of Hazard Analysis and Critical Control Points-type preventive approaches from farm to table to reduce potential foodborne hazards. The Beef Quality Assurance Program is an important step by the cattle industry to encourage farmers and ranchers to follow the program in order to prevent illegal chemical residues in beef." Burke Healey, a cattle producer from Oklahoma said, in 1997, "Year after year, the USDA residue testing program has proven the real success of our industry's Beef Quality Assurance Program. Beef has a residue-free record that is second to none." John W. Algeo, former Head of Animal Science at Cal Poly University said, in 1997, "I think that the Beef Quality Assurance Program, as it has evolved over the last ten years, is one of the most important things that we have done in the beef industry. The degree of progress has been astonishing."

The Project Evaluation Audit conducted in July 1995 by the Cattlemen's Beef Promotion And Research Board provided the following "Recommendations for future activity and direction of the Beef Quality Assurance Program":

- The Beef Quality Assurance Task Force (BQATF) should develop and approve a long range plan for the BQA Program to provide it with continued focus and direction. The plan should include program objectives, an implementation schedule and preliminary, budget projections.
- Insure the entire BQA Program continues uninterrupted during the industry consolidation. The continuity of the program is essential to the success of the Beef Industry Long Range Plan.
- Continue to keep the structure of the program (from the national to the local level) lean and non-bureaucratic.

Beef cattle producers have enthusiastically supported the BQA Program. In 1997, Gene Wiese of Iowa said, "Our family is committed to producing the finest and highest quality product that we can for consumers. Because we're at the beginning of the entire beef process, we must do our part in producing safe, healthy food," while Chaunce Thompson of Texas said, "The Beef Quality Assurance Program unites all of us--from producers to grocers to consumers--with a plan to ensure that consumers have a great eating experience every time." Alan Janzen, a beef producer from Nebraska said, in 1997, "Beef Quality Assurance is a two-pronged program. It helps inform

producers about the latest management techniques and makes consumers more aware of the extra efforts the beef industry is making to deliver safe, quality beef."

The composition of the present (1997) NCBA, BQATF is Gary Cowman and Michael Smith (staff) and--as members of the Advisory Board--Ran Smith, Harvey Mitchell, Jack Algeo, Bob Bohlender, Wes Bonner, Duane Flack, Jim Floyd, Burke Healey, Ken Jordan, Dell King, Kelly Lechtenberg, Scott Laudert, Dick Mercer, Louis Perino, James Pritchard, Nancy Robinson, Walt Rowden, Dean Settje, Bob Smith, Jerry Swanson and Gene Wiese. Dr. Ran P, Smith, Kansas veterinarian and beef cattle producer as well as Chairman of the NCBA, BQA Task Force said, in 1997, "The U.S. cattle industry is committed to providing the consumer with a high-quality, wholesome and safe product. The Beef Quality Assurance Program serves as an intricate, producer-driven mechanism for reaching this goal."

CONCLUSIONS

Families in the U.S. and abroad expect quality beef. The BQA Program's mission was, is, and remains--"To maximize consumer confidence in, and acceptance of, beef by focusing the industry's attention on beef quality assurance through the use of science, research and education initiatives." Created ten years ago by the National Cattlemen's Beef Association, the BQA Program has established a remarkable record of achievements, by serving as a catalyst--uniting animal scientists, veterinarians, feed suppliers, animal health companies, packers and retailers with cattle producers--to encourage that the latest in science and technology is used to meet expectations about beef quality, wholesomeness and safety. In the past, present and future, the goal of the Beef Quality Assurance Program of the National Cattlemen's Beef Association is "To produce safe, wholesome beef that provides a great beef eating experience every time."